Briefing Paper on North Delta Diversion Facilities

Major issues/decisions to be made:

1. **Phasing of project to meet performance criteria**
   Issue: The FFFT report contains recommended physical performance criteria and recommended pre-construction and post-construction studies. It also included a "goal" of achieving no detectable decrease in overall fish survival as a result of meeting these physical criteria. The report does *not* include any recommendations on specific biological criteria related to phasing or an experimental design to lead to phased construction.

   Principles discussion/decision:
   - Should the construction of the intakes be phased, and for what purpose?
     - To inform re-design of the screens in second phase
     - To inform re-design of entire diversion structures in second phase
     - To inform relocation of diversion structures in second phase
     - To inform whether further construction should cease.
   - What are alternative definitions and the benefits and costs of phasing, and implications for project permitting?
   - Should a biological technical team (possibly Goals and Objectives Team) be tasked to develop specific biological performance criteria?
   - Should the Delta Science Program assist in developing an experimental design to accompany phasing concept, for further review by Principles?

   FFTT recommendations: The FFTT recommended multiple physical performance criteria for the screening facilities (sweeping flows, approach velocity, baffling, etc.) with the intended overall goal of avoiding any increases in mortality of covered fish in the vicinity of the diversion structures (over the current baseline mortality rates), but the team did not determine specific biological criteria that would be used to trigger non-completion of remaining phases. The team also developed two tables that describe the pre-construction (baseline) and post-construction (project operation) studies necessary to "to reduce key uncertainties and improve the diversion and fish screen design" (Table 1), and "to ensure screens are meeting performance criteria and if projects are phased, to allow for design improvements to subsequently-constructed diversion structures." (Table 2).

   The team did not include any recommendations on specific biological criteria related to phasing, but there was discussion that the section 7 jeopardy analysis conducted during the permitting process would likely be the place where the threshold of impacts for discontinuing subsequent phases would be determined, if not included in the proposed project.

   The following question could be posed to outside science review:
   - What experimental design is necessary to determine that a first set of diversions is (and will continue) meeting all of the FFFT recommended performance criteria? The report provides lists of studies, but does not develop an experimental design.

Background: The proposal for 15,000 cfs of N. delta diversion capacity results in an unprecedented combination of size, location, and number of diversion structures in this area. This results in a level of uncertainty, as to the biological effects of operating such a system, which is insurmountable using the currently available tools and information. The regulatory agencies have consistently asserted that this significant uncertainty necessitates the development of specific performance criteria for the operation of the diversions, and that an initial set of diversion structures would need to be evaluated and determined to be meeting the necessary performance criteria prior to constructing subsequent facilities.

DWR and the water contractors have voiced well warranted concerns that such a phased approach to the project could result in significant impacts to overall costs and time schedules for the project and could ultimately result in a lower north delta diversion capacity than is currently proposed.

This issue is potentially "schedule critical" for completion of the effects analysis, as addressing uncertainty is one of the key elements of the effects analysis and the decision on this phasing concept will have a great impact on the level of uncertainty of the effects of the project on biological and water resources. This issue may not be "schedule critical" for completion of the DEIS/DEIR as the proposed alternatives to be analyzed include several different north delta diversion capacities and it may be possible to "plug in" the analyses of different capacities to simulate the phasing of these capacities.

2. Placement of one or two diversion structures downstream of Steamboat and Sutter Sloughs.

Principles discussion/decision:

- Under what venue should the necessary biological, hydrological, and structural analyses related to placement of diversion structures downstream of Steamboat and Sutter Sloughs be conducted?
    - i. Inserted into one of the alternatives to be analyzed under NEPA/CEQA.
    - ii. As a "separate analysis" within the NEPA/CEQA or BDCP analytical process.
    - iii. Independent science review.

FFTT recommendations: The FFTT found that there were potential benefits to covered species from placing intakes below the sloughs as well as potential drawbacks. The team felt that more detailed analyses were necessary to allow for a well informed decision to be made, and recommended that such an analysis be conducted within the NEPA/CEQA process. They did not specify exactly how that analysis should be conducted (pertaining to 2nd bullet above).

Background: This issue has also been contemplated for several years in the development of the BDCP. The basic concept is that if you build intakes below the sloughs, any fish that travel down those sloughs (instead of the main channel Sacramento R.) will avoid any impacts of migrating past the lower intakes. There is also a potential secondary benefit to critical habitat in leaving more water in the river and the sloughs further downstream.

The potential drawbacks of downstream intakes are both biological and physical. Under current conditions, the known concentrations of delta smelt are generally greater as you move in a downstream direction in this area of the Sacramento R., so there is a potential for increased exposure to the diversion facilities if they are built lower downstream. There are also concerns as to the impacts of sea level rise, salinity, and tidal fluctuations on the diversion capacity of downstream intakes, all of these issues generally become greater as you move in a downstream direction. A "separate analysis" conducted by the BDCP consultants found that placing intakes downstream of the sloughs would not affect the overall diversion capacity or water quality (salinity) for the project, but this analysis assumed 2025 conditions (for sea level rise) and further, more detailed analysis is warranted.

This issue is potentially "schedule critical" for completion of the effects analysis and DEIS/DEIR, as it could influence several factors of the EA (benefits to salmon and smelt that avoid downstream intakes and impacts to smelt that might be more likely to encounter downstream intakes) and several factors of the DEIS/DEIR (footprint of the diversion structures and connection facilities and long term effects on water supply and water quality).

Next steps: Need additional information from ICF to understand implications of conducting this analysis on schedule for EA and DEIS/DEIR.

3. Shorter screen with higher approach velocity vs. longer screen with lower approach velocity.

Principles discussion/decision:

- Should the FFTT recommendations on this topic be adopted, subject to hydrologic modeling and design optimization?

FFTT recommendations: The FFTT recommended that diversion structures should be as short in length as practicable to reduce the duration of fish exposure to the screen surface. They described one scenario for achieving this goal which involved building the screens to meet an approach velocity of 0.33 fps (higher approach velocity = shorter screens) and operating them to meet 0.2 fps approach velocity when smelt are present in the area (short screens + low approach velocity = reduced pumping rate). The team also described several scenarios/design optimizations that could reduce any impacts on export levels while still maintaining the shorter screen length. *The ultimate determination was that a full optimization analysis should be conducted to determine the best way to balance screen length, approach velocities, and export rates.*

Background: This is another long standing issue (this same recommendation was included in the 2008 FFTT report) that potentially pits biological impacts against water supply goals. The 3 questions above frame the analyses that need to be conducted to determine the potential trade-offs and potential solutions to this issue. The first step should be to model the likely effects on water supply of following the FFTT recommendations. If the impacts to water supply appear to be significant, then the next (or concurrent) analysis should be an optimization study to determine how best to balance these two conflicting issues.

This issue is potentially "schedule critical" for completion of the effects analysis and DEIS/DEIR, as it could influence several factors of the EA (impacts of diversion facilities/operations on covered species) and the DEIS/DEIR (overall water supply for the project).

Next Steps: Need additional hydrologic modeling on water supply impacts of FFTT recommendations to assist in design optimization.